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## Socio-Economic Assessment of the Impacts of Trypanosomiasis on Cattle in Girja District, Southern Oromia Region, Southern Ethiopia

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**Abstract:** Across-section study was conducted in and around Girja Woreda from September 2011 to March, 2012 to determine the economic impact of trypanosome in cattle. Questionnaires based information was used to assess the economic significance and determine factors assessed in relation to economic impact of the disease. Out of 60 villagers asked about the impact of trypanosomosis of cattle. The result revealed that trypanosomosis as a disease of livestock in the area, the most important and the first problems affecting livestock productivity and agricultural activity as per 95% of the respondents. Nearly all respondent explained the direct impact on livestock productivity include reduce meat and milk off take, increase calving rate, increase in calf mortality and increase in cost of live stock management. Indirect impact of trypanosomosis include decrease crop production, decrease traction power, reduces work efficiency of both man and animals. The occurrence of such infection subjected the community to additional expenditure estimated for about 480 Ethiopian Birr per household (US\$28.23) on preventive and 320 ETB (US\$ 18.2) per house hold on curative drugs. Trypanosomosis is probably the only disease which has profoundly affected the settlement and economic development of a major part of the community in the study area. Therefore, trypanosomosis is the most important problem for agricultural activity and animal production in the areas and the situation is getting worse as the control and prevention of trypanosomosis is facing a challenge due to limitation of vector control activities and the development of drug resistance in the area. These results show the dramatic impacts that trypanosomosis cause a series problems in the area.

**Key word:** Girja district • Cattle • Economic impact • Trypanosomosis • Tsetse fly

### INTRODUCTION

Livestock are the back ground of the socioeconomic system of the most of the rural communities in the continents of Africa. This can be noted more clearly with those who are adopting the pastoral and semi-pastoral way of living. These people own approximately 50% of Africa livestock, equivalent to approximately 225 million animals [1,2].

The number of pastoralists in sub-Saharan Africa has been estimated to be more than 50 million people [3]. The economical impact imposing by the disease directly affects the milk and meat productivity of animals, reduce the birth date and increase the abortion rates as well as mortality rate: - all of these affect the herd size and hared composition [4-6].

African animal trypanosomiasis and its vectors occur in vast area of sub-Saharan Africa with devastating impact on livestock productivity. Its epidemiology and impact on livestock (especially cattle) production are determined largely by prevalence and distribution of the disease and its vectors in the affected areas. Trypanosomiasis is one of the most important serious diseases of livestock and human in worldwide which cause serious disease in domestic animals and human beings in sub-Sahara Africa [7,8].

Trypanosomiasis and drought are probably the two largest limiting factors for cattle production. In Africa trypanosomiasis estimated to cost between 1-4 billion US dollar per year loss to African farmers that are mainly used in Europe and North America for meat and milk production in large scale intensive farms. Production system in Africa

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vary from the pastoralists who live in semi-arid areas unsuitable for arable crops to the small dairy farmers who couple of cows to produce milk for sell to pay for schools, medicines and clothes [6, 9,10].

Among African country Ethiopia has largest number of livestock population. some estimation indicate the Ethiopia has largest number of livestock population indicate by 29.82 million cattle, 11.5 million, 9.61 million of goats, 1.12 million of horses, 2.6 million of donkey, 1.09 million and 62 million of poultry [11,12].

In Ethiopia the land covered by trypanosomiasis (tsetse infestation) estimated around 200,000 km<sup>2</sup> fertile land remained unusable. This disease cause direct loss (mortality) estimated to amount 1.5 to 2 billion birr pee year and indirect losses due to decreasing productivity and restriction from international livestock trade in country [4,5, 7, 13].

Among the Ethiopian regions Oromia is known by huge cattle population. Guji zone is one zone of Oromia region which found in southern part of Ethiopia known by pastoralist area. This research study concern on impact on trypanosomiasis in the district and explain the possible solution will be suggested. Generally, researches play a role to cultural, social, economical, even political life of people. Research data on the economics of trypanosomiasis in cattle is unavailable in and around Girja woreda southern part of Oromia Regional state. Therefore, the objective of current research work is to determine the economic impact of trypanosomiasis.

## MATERIALS AND METHODS

**Study Area Description:** The study would be conducted in Girja woreda which is located in southern parts of Oromia regional state Guji zone in eastern direction. Girja woreda is one of pastoralist area at distance of 207 km from zonal town Negelle and found at distance of 559 km from Addis. Topographically, the district is surrounded by mountains, planes and rivers like Ganale, Gabarticha and Iya. The climatic conditions comprises dega 4%, 6% woinadega and the rest 90% is kola with annual average temperature 28 - 34 °C and have annual rainfall of 700-1000 mm with altitude of 1400 masl. The livestock population includes cattle 123595, sheep 4268, Goat 89806, equine 7878 and poultry 52,345. The major human population in the distinct estimated to 55,876, of which 28162 are males and the remaining 27714 are females [14].

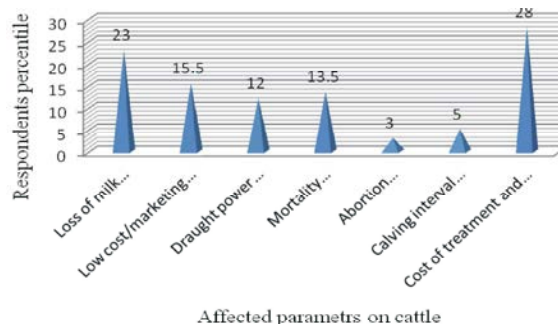


Fig. 1: Impact of Trypanosomiasis (direct and indirect) economic losses as analyzed from the questionnaire

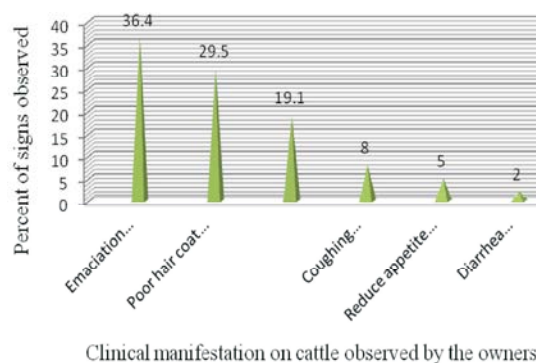


Fig. 2: Questionnaires on the clinical signs observed by the respondents.

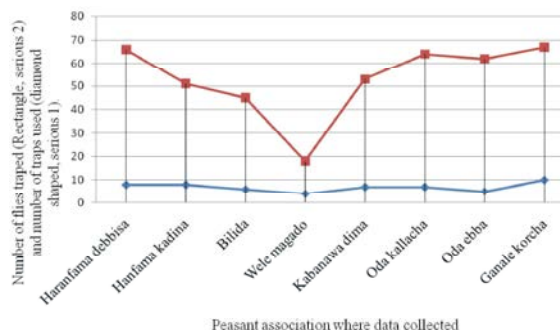


Fig. 3: A figure that depicts the number of flies trapped and the peasant associations where samples taken.

**Study Animal:** Cattle population of Girja woreda which is managed under traditionally reared management system was selected for study to determine the impact of Trypanosomiasis in cattle.

**Study Design:** A questionnaire survey study covering the 4 kebeles of Girja Woreda and two neighboring woreda: Adola woreda and SNNP of Sidama zone were used.

**Sample Size:** About 60 villagers were asked during the study from 4 different kebeles of Girja Woreda and two from the Adola Worda & two from Sidama zone of Girja kebele.

**Sampling Procedure:** Structured questionnaire was administered and there was interview done for pastoralist.

**Data Analysis:** Data analysis was performed using Stata and SPSS version 10.0 and 17.0 respectively for the analysis. The association between the risk factors and economic impact was also seen if any.

## RESULTS

**Questionnaire:** A total of 60 villagers were interviewed. All were farmers. The interviewees were selected randomly from the study area. All the interviewed people responded to the prepared questionnaire format.

**Socioeconomic Status:** Above 97% of the respondents livelihood is depends on mixed crop livestock production systems. Livestock are integral part of agricultural activity and are used as food, source of income and for transport purposes. The average number for cattle was 5cattle/household and the cultivated land was about 3 hectare/household level.

**Livestock Management:** Livestock is reared primarily for draught purposes where oxen and sometimes cows used for this purpose in order of importance. Livestock also used for milk, meat, source of income and transportation. The composition of livestock species in the study area was cattle (75%), small ruminants (15%) and equines (10%).

The grazing and watering points are far away from their locality (90% of the respondents) during the dry period. Crop residues and grasses preservation for dry period shortage of feeds is practiced.

**Livestock Constraints:** According to the respondents, the main livestock constraints in the study area include livestock diseases, lack of grazing land and watering points and scarcity of modern veterinary service. Based on the interview result, the main livestock diseases in order of importance are; trypanosomosis, anthrax, pasteurellosis, blackleg, internal parasites, abortion and external parasites.

Trypanosomiasis has direct impact on livestock productivity by reducing meat and milk off take, increasing calving rate, calf mortality and livestock management especially the number of livestock kept by farmers, the breed and species composition of the livestock herd, loss of draft power, mortality, abortion and cost of trypanocidal drugs and insecticides (Figure 1).

The questions about transmission of trypanosomosis was responded as follows; 80% of the respondents indicated that the transmitter and cause of the disease is the environment, 15% of the respondent believe biting flies 'tabanids and muscids flies' and other flies they characterize small in size, brown in color biting their animals where the animals move to the forest and savanna vegetation the so called "tsetse fly" and only 5% of the interviewed people didn't know any about the cause and transmitter of trypanosomosis.

Trypanosomosis as a disease of livestock is the most important and the first problems affecting livestock productivity and agricultural activity as per 95% of the respondents. Almost 100% of the respondents consider trypanosomosis is mainly a disease of cattle. The main clinical signs of trypanosomosis as known by the interviewed people included; ruffled hair coat, diarrhea, coughing, constipation, emaciation, weakness, reluctant to move, isolated from the herd, depression, abortion, in appetite and others.

The total number of tsetse fly caught during the study period was 388 out of which the highest 89 flies were recorded in Ganale korchia and the lowest 14 flies were collected in wele magado in 10 and 4 traps respectively. This indicates that the area was highly infested with the flies that leads to considerable economic losses for control methods as well as disease consequences.

As revealed by the respondent, the use of trypanocides is a common practice in the area. Nearly all the cattle owners are familiar with these trypanocides (mostly berenil, samorin and homidium). The total household expenditure on trypanocidal drugs now increased from time to time. The estimated annual expenditure on preventive drugs was about 480 ETB per household (US\$28.23). Although the annual expenditure on curative drugs per household also cost to the amount 320 ETB (US\$ 18.2) per household.

### Economic Losses of Trypanosomiasis Related to Trypanocide Drugs:

- Pastoralists use trypanocides 52%
- Mean expenditure per year on the preventive drug
- Per house hold 480 birr
- Per head of cattle 15 birr
- Mean expenditure per year on the curative drug Per house hold 320 birr
- Per head of cattle 10 birr

### DISCUSSION

The present study indicates that tsetse and trypanosomiasis are still of much concern and represents a major obstacle to livestock production and development of agricultural sectors. The study further revealed Trypanosomiasis is probably the only disease which has profoundly affected the settlement and economic development of the community. This is supported by Swallow [6] and Tewodros *et al.* [15] that revealed Trypanosomiasis is a disease which affects the life of people, the way they manage their livestock and the number of animals that they keep. The same result reported by Tewelde [16], Abebe [17] and Feyissa *et al.* [18] from western and northwestern parts of Ethiopia where tsetse-transmitted trypanosomiasis is the primary problem for livestock productivity and agricultural development.

In the current studies, the respondent revealed that trypanosomiasis has direct impact on livestock productivity by reducing 23% meat and milk off take, 5% increasing calving rate, 13.5% mortality and livestock management especially the number of livestock kept by farmers, the breed and species composition of the livestock herd, 12% loss of draft power, 3% abortion and 28% cost of trypanocidal drugs and insecticides. This result is comparable with the study conducted in Nigeria by Onyiah [19] the disease causes significant productivity losses on average 13% reduction in milk production, 11% reduction in meat off-take and 21% loss in animal traction days.

It is much lower the result reported by Swallow [6] in the tsetse-infested areas as a whole, trypanosomiasis reduces the off take of meat and milk by at least 50%. And by generally constraining farmers from the overall benefits of livestock to farming, less efficient nutrient cycling, less access to animal traction, lower income from milk and meat

sales, less access to liquid capital, trypanosomiasis reduces yields, area cultivated and the efficiency of resource allocation by 50%.

The questionnaire survey has revealed the concern of livestock farmers on the problem of tsetse fly and trypanosomiasis. Their responses to questions about the presence of tsetse fly and trypanosomiasis, the symptoms or signs of the effect of this disease and its vector and the high cost of trypanocidal drugs among other questions show that there is a great economic impact on the livelihood of the community. About 97% of the farmers believed that their income would reduce as a result of treating and preventing trypanosomiasis in the area. Almost all the cattle owners are familiar with these trypanocides (mostly berenil, samorin and homidium).

Similar results were also reported by Tewelde [16] and Abebe [17] about 57% and 43% of the drugs applied by the farmers themselves and other uncertified people. Above 90% of the treatment was given for clinical cases and 10% for nonclinical cases. Similar results in the areas of Zambia and upper Didessa valleys of Ethiopia [16, 20] showed 85% of the treatment was given for clinical cases. Survey conducted in West Africa [21] indicated that trypanocidal drugs used greater than 90% of all cases without diagnosis of the exact cause of the disease entity.

The total household expenditure on trypanocidal drugs now increased from time to time. In the present study, the estimated annual expenditure on preventive drugs was about 480 ETB per household (US\$28.23) and the annual expenditure on curative drugs per household also cost to the amount 320 ETB (US\$ 18.2) per house hold.

The costs of these techniques vary by country. The cost in the current study is relatively less as compared to the study conducted by Cattand *et al.* [22] that reported average costs for animals treated with insecticide on a limited basis. The cost amounts to US\$ 43.3/house hold per year and expend US\$ 34.12 per household for curative drugs to treat the sick animals

The total number of tsetse fly caught during the study period was 388. This indicates that the area was highly infested with the flies that lead to considerable economic losses for control methods as well as disease consequences.

PATTEC [23] reported approximately 35 million doses of trypanocidal drugs (worth about US \$35 million) is bought every year in futile efforts to maintain livestock free of the disease. The annual cost related to treating the

disease or controlling the vector, has recently been estimated at US \$1.2 billion. This figure shows the very high economic losses for the area which infested with tsetse flies

## CONCLUSION

Trypanosomiasis is the major constraint retarding livestock production particularly cattle in the study Area. Trypanosomiasis directly constrains the productivity of cattle by reducing birth rates, increasing abortion rates and increasing mortality rates. The illegal use of trypanocide drug in the study area leads to drug resistance and significant economic losses related to prevention and control of the disease. Without effective drug therapy, increases in the incidence of trypanosomiasis can devastate herds of trypano-susceptible cattle and the farming systems into which those cattle are reared. In conclusion, the potential for increasing livestock production can only be fully realized if the animals are adequately protected against the adverse effects of periodic stresses and diseases. For sufficient livestock production and fully realized country development, integrated approach to trypanosomiasis control is required to increase the present level of livestock production.

**Recommendation:** Designing and implementation of control strategies of trypanosomosis focusing integrated approach (vector control and chemotherapy) should be undertaken in the study area. Proper and strict follow-up of trypanocidal drugs treatment should be done by professionals and supervision of the field personnel by experts should be practiced. The delivery and distribution of trypanocidal drugs should be given special attention to avoid misuse. Awareness creation about the disease and control methods as well as the risk of trypanocidal drug resistance is required in the area. Well-designed surveys should be conducted as a way to obtain estimates of economic impacts on production and productivity and confounding factors associated with farmers' perception should be assessed using modeling to evaluate direct and indirect impact of tsetse and trypanosomosis.

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